Rock Island Arsenal
Post Building
(Fire Engine and Main Guard House, Building 225)
Rodman Avenue between Flagler Street and
Gillespie Avenue
Rock Island
Rock Island County
Illinois

HABS No. IL-1001-B

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
National Park Service
Department of the Interior
Washington, D.C. 20013-7127

HISTORIC AMERICAN BUILDINGS SURVEY

ROCK ISLAND ARSENAL HABS No. IL-1001B
POST BUILDING
(Fire Engine and Main Guard House, Building 225)

Location: Rodman Avenue between Flagler Street and Gillespie Avenue,
Rock Island Arsenal,
Rock Island,
Rock Island County, Illinois

USGS Davenport East Quadrangle,
Universal Transverse Mercator Coordinates:
15.704620.4598870

Present Owner and Occupant: U.S. Army

Present Use: Fire station and security office

Significance: After taking command of Rock Island Arsenal in 1865, General Thomas Jefferson Rodman devised a master plan for the installation calling for the construction of ten large manufacturing shops, five on each side of the island's major east-west thoroughfare. These core manufacturing structures were supplemented by a variety of administrative, residential, maintenance, storage, and utility buildings. Although only a few buildings were erected prior to Rodman's death in 1871, subsequent construction under Rodman's nineteenth-century successors closely conformed to the original plan.

Representing one of the largest military construction projects of the late nineteenth century, the various facilities constructed under the Rodman plan are a unique example of military installation planning, design, and construction. In addition to their architectural importance, they constitute the admnistrative and technological core of Rock Island Arsenal, one of only two "old-line," nineteenth-century arsenals still in operation for munitions production. The buildings are vital for understanding the history of American ordnance development and manufacture from the Spanish American War to the present.

Located just west of the central manufacturing buildings, the Post Building was

erected under the Rodman plan in 1873-1874. It originally served as a combined guard house, fire station, storehouse, and administrative office. Although its storage and administrative functions were later transferred to other structures, it still functions as the arsenal's main fire station and security office. It is part of the Rock Island Arsenal National Register Historic District.

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: On April 1, 1873, Major S. V. Benet of the Ordnance Department in Washington wrote the arsenal's commandant, Colonel Daniel Webster Flagler, that "in the opinion of this bureau, the guard house should be placed on Main avenue [i.e., Rodman Avenue] between the shops and the Rock Island bridge connecting Rock Island and Davenport, and you will please select a site accordingly, and give your views for and against such a location." Flagler complied on May 17, 1873, and the present building site was selected by Washington on July 3, 1873 (Flagler, pp. 279-282). Flagler sent final plans for the building on July 12, 1873, and they were approved that same month (Flagler, p. 282; see HABS Photo Nos. IL-1001B-10; IL-1001B-12; IL-1001B-13). According to Flagler, "the post building, containing the main guard house, fire engine house, and quartermaster and commissary storehouses and offices, was built in 1873 and 1874" (Flagler, 271).

2. Architect: Not known. Plans were prepared by Ordnance Department staff under the supervision of Flagler (Flagler, pp. 260, 279-282).

3. Original and subsequent owners: U.S. Army.

4. Builder, contractor, suppliers: "The contract for the rubble and pilaster blocks was awarded to Martin Heisey, of Anamosa, Iowa. The quarry from which the stone was taken is known as the Iowa State quarries. The stone was quarried by the convicts confined in the penitentiary at Anamosa. The price of the stone delivered on cars at the arsenal was $8 per cubic yard. The dimension stone was ordered from J. A. [Green], of Anamosa, Iowa. The price was $12.40 per cubic yard delivered on cars at the arsenal" (Flagler, p. 282).

"All of the work . . . was done by day workmen, employed and paid by the Government. The work was directed and superintended directly by officers of the Ordinance Department stationed at the arsenal, and the necessary engineering work, calculations, making of tests, experiments, etc., was also done by the officers" (Flagler, p. 260).

5. Original plans and construction: On July 12, 1873, Flagler wrote the Chief of Ordnance in Washington, "I have the honor to return herewith drawings of a new fire engine house, guard house, and commissary officers and storehouses, to be built at this arsenal. . . . The walls of the building are to be of stone, heavy range rubble, with cut stone entablature, caps, sills, water table, and jamb stones. The pilasters are to be of ashlar. The architecture is very nearly the same as that of the shops, though I have been forced to reduce greatly the cornice and architrave, and expense in other parts of the building, to brings its cost within the appropriation." (Flagler, pp. 281-282).

The Rock Island Arsenal Engineering Plans and Services Division has tracings, completed in 1948, of two original drawings that were labeled "Returned to Chief of Ordnance July 12, 1873." One drawing (see HABS Photo No. 1L-1001B-14) shows the "first floor plan"; the other (see HABS Photo No. 1L-1001B-11) the "second floor plan." The Engineering Plans and Services Division also has original drawings of the "Front Elevation" (see HABS Photo No. IL-1001B-10) and "End Elevation" (see HABS Photo No. IL-1001B-13), both labeled "Approved by the Secretary of War July 1873."

The north and south elevations were constructed according to the original drawing for the "Front Elevation" (see HABS Photo No. 1L-1001B-10). The original construction of the north elevation is documented by a photogaph, dated ca. 1875, in the picture collection of the Rock Island History Historical Office (see HABS Photo No. 1L-1001B-8). Although there is no early photograph of the south elevation, its present configuration is identical to that shown in the original drawing and in the 1875 photograph of the north elevation.

The east and west elevations were not constructed according to the original drawing for the "End Elevation" (see HABS Photo No. IL-1001B-13). The drawing shows four regularly spaced windows on the first and second floors. The original floor plans for the first and second stories, however, show only three regularly spaced windows; this arrangement is documented for the east

facade (and presumably for the west facade, which was to be identical) by the 1875 photograph (see HABS Photo No. IL-1001B-8).

6. Alterations and additions: Before 1898, the central window on the first story of the west facade was remodeled into a single-leaf personnel door. The alteration is documented by a photograph published in 1898 (Tillinghast). About 1919, this door was remodeled back into a window, the two other windows on the west facade's first floor were replaced by oversized vehicle doors, and a brick hose drying tower was added to the building's southeast corner. These alterations are noted in an architectural drawing in the Rock Island Arsenal Engineering Plans and Services Division, entitled "Preliminary Alterations for Fire Engine House, May 8, 1919, RIA B225-A4, DA0039F." The completed work is documented by a photograph, dated 1920, in the picture collection of the Rock Island Arsenal Historical Office. The photograph is captioned on the front: "425-34417 / Sept. 28, 1920 / Guard and Fire House, Bldg. No. 225, looking southeast." The completed hose drying tower is also shown in a photograph of the east elevation, dated September 26, 1919 (see HABS Photo No. 1L-1001B-9.)

   Between 1898 and 1918, the arched doorway and the two flanking first-floor windows of the central pavillion of the north facade were replaced by two over-sized, vehicle doors separated by a narrow stone pier and flanked by a small window. The completed work is documented by a photograph in the picture collection of the Rock Island Arsenal Historical Office, captioned on the front: "257-3236 Dec. 17, 1918 / Fire Headquarters."

   In 1962, the vehicle doorways on the west facade were widened by removing stone from the central bay, as documented in photograph in the Engineering Plans and Services Division. The photograph is captioned on the front, "11-070-389-1448 / 31 May 1962 / Stone That Was Removed from West Side of Building 225 on 29 May 1962." In 1980, new overhead vehicle doors were installed on the north facade, necessitating the lowering of the grade by four inches and the construction of a new concrete slab. The Engineering Plans and Services Division has an architectural drawing for this work entitled, "Overhead Doors and Foor Slab Bldg 225 / Drawing No. 225-19 / May 7, 1980."

B. Historical Context:

On April 1, 1873, Major S. V. Benet of the Ordnance Department in Washington requested Major Daniel Webster, commandant of Rock Island Arsenal, to prepare plans for a guard house at the installation.

Six weeks later Flagler sent Washington initial drawings for a multi-purpose building, which he called the "post building" (Flagler, pp. 279, 271). In an accompanying letter, Flagler described the structure's basic features and rationale:

> The fire engine house, guard house, and commissary's and quartermaster's storehouse and offices are all placed in one building, for economy, convenience, and appearance. The convenience or rather advantages arising from having the guard house and engine house in the same building . . . are generally well understood. Beside the economy which ordinarily attends combining several small buildings in one, the economy in this case is much more important. We get good and sufficient quartermaster's and commissary's storerooms with little expense, and save greatly in expensive external walls for all the buildings. The building must be of stone, and accord in architecture with the other arsenal buildings, or the appearance, harmony, and character for permanence of the arsenal will be destroyed. This architecture, in stone, is expensive. By combining the buildings, nearly one third of the external wall is saved, and, in this respect alone, more than one fifth of the toal cost is saved (Flagler, p. 280).

In July 1873, the Ordnance Department approved the building's design, and the Post Building was erected in 1873-1874 on Rodman Avenue, just west of the main manufacturing shops. Although the building's original storage and administrative functions were later transferred to other structures, the Post Building still serves as the arsenal's main security office and fire station. The Post Building has been designated as "Building 225" at least since World War II ("Industrial Facilities Inventory"). (For further documentation see HAER No. IL-20.)

Prepared by: Jeffrey A. Hess
MacDonald and Mack Partnership
February 1985

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The building is a late Greek Revival style, rectangular-plan, limestone building. It stands two stories above a partial basement, witb a gabled roof covering an unfinished attic. There ia an attached, four-story, brick hose tower. The building survives as good example of its building type.

2. Condition of fabric: The building is well-maintained and is in good condition.

B. Description of Exterior:

1. Overall dimensions: The building measures 105' (9 bays) x 39' (3 bsys) witb 39' (3 bays) x 10' (1 bay) projecting pavilions centered in the north and south elevations and a 10' (1 bay) x 10' (1 bay) hose tower in the corner west of the soutb pavilion. The building is two stories tall witb a basement under the west end only and an unfinished attic.

2. Foundations: Coursed, rock-faced ashlar limeatone below a dressed ashlar limestone water table. Reinforced concrete at the hose tower.

3. Walls: Coursed, rock-faced ashlar limestone (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, IL-1001B-4, and IL-1001B-5) with dark brick walls at the hose tower (HABS Photo No. II-1001B-4). Colossal rock-faced ashlar limestone pilasters (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, IL-1001B-4, and IL-1001B-5) rising from the water table to the entablature divide the elevations into a regular bay aystem. The dressed limestone entablature (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, and IL-1001B-4) carries a projecting dressed limestone cornice. The pedimented gable ends (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, and IL-1001B-4) are rock-faced asblar limestone with dressed limestone cornices.

4. Structural systems: Brick bearing with asblar limestone exterior veneer, brick interior bearing walls, and brick bearing walls in the hose tower. There are two reinforced concrete piers in the basement. The first-story floor system is reinforced concrete beams and alab. The second-story floor system is steel beams. The roof system is sawn timber beams and sawn woodjoists.

5. Ladders: A set of steel rungs is set in the south end of the west elevation of the hose tower leading from grade level to the roof.

6. Openings:

a. Doorways: There are five large doorways. The one centered in the south pavilion (HABS Photo Nos. IL-1001B-3, IL-1001B-4, and IL-1001B-5) retains its original opening, which has a rock-faced limestone segmental-arched head with a rock-faced keystone, rock-faced limestone jambs, and concrete sill. The original doorway of the west elevation has been replaced with a pair of doorways (HABS Photo No. IL-1001B-1) of which each has a wide, rectangular opening abutting the outside pilasters and running under the inside pilasters. The lower portions of the inside pilasters of the north pavilion face have been removed to accomodate a pair of similar doorways (HABS Photo Nos. IL-1001B-1 and IL-1001B-2) centered in that elevation. All of these doorways contain modern overhead doors. Original doorways (HABS Photo Nos. IL-1001B-1, IL-1001B-2, and IL-1001B-3) remain in the second bays from the ends of both the north and south elevations. They have dressed limestone lintel blocks, rock-faced limestone jambs, and concrete sills. The two doorways at the east end of the north and south elevations each have a modern glass door and a transom with raw aluminum framing. The west doorway of the south elevation has been filled with brick. The west doorway of the north elevation retains its original, four-panel, wood door with a three-light fixed, wood transom sash above.

b. Windows: Typical first- and second-floor window openings (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, and IL-1001B-4) have rock-faced limestone jambs, cut limestone sills and flat lintels and contain six-over-six, double-hung, wood sash on the first floor and three-over-three, double-hung, wood saah on the aecond floor. Flanking the large north pavilion doorways are single window openings (HABS Photo Nos. IL-1001B-1 and IL-1001B-2) containing one-over-one, double-hung wood sash dating from the remodeling of this elevation. The attic gable enda contain pairs of window openings (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, and IL-1001B-4) with rock-faced limestone jambs, segmental-arched, rock-faced limetone arches and keystonea, and dressed limestone sills. They contain six-over-six, double-hung, wood sash, of which all but one of the lower sash have been replaced with aluminum louvered vents. The south and north walls of the basement each contain a single window opening with rock-faced jambs and sills and a lintel formed by the water table. Each contains a three-light, wood awning sash. The hose tower window openings (HABS Photo No. IL-1001B-4) have flat, dressed limestone sill and lintel blocks and brick jambs and contain typical six-over-six, double-hung, wood sash. All wood sash are painted white.

7. Roof:

a. Shape, covering: The roof (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, and IL-1001B-4) is a cross-gable form covered with aspbalt shingles.

b. Cornice, eaves: The projecting cornice and eaves (HABS Photo Nos. IL-1001B-1, IL-1001B-2, IL-1001B-3, and IL-1001B-4) are dressed limestone. The interior metal gutter system is tied to exterior metal leaders which lead to an underground drainage system.

C. Description of Interior:

1. Floor plans:

a. Bssement: The basement, located in the west end only, is an open plan storage area.

b. First floor: The first floor has large fire engine rooms in the center and west end. The east end contains a men's restroom and rooms for the police station.

c. Second floor: The second floor center contsins a large kitchen, pantry, restroom, and dining/living room for the firemen. The west end is devoted to a single, large dormitory room, also for the firemen. The east end contsins offices for the police and a women's restroom.

d. Attic: The attic is open and unfinished.

2. Stairways: There are three stairways and one fire pole serving the building. In the northeast corner is an L-shaped stairway with winders running hetween the first and second floors. Of wood construction, it is enclosed on hoth sides and has two pipe railings attached to its walls. In the northwest corner of the center portion is an open, spiral, cast-iron staircase (HABS Photo No. IL-1001B-6) lesding from the first to the second floors. South of this staircase is a polished brass fire pole (HABS Photo No. IL-1001B-6). At the south end of the east wall of the east end is a straight-run, wood staircase from the first floor to the basement. Of simple wood construction, it has a plain wood railing on its open side. At the south end of the west wall of the hose tower steel rungs are attached leading to the small room at its top.

3. Flooring: Basement flooring is brick in a herringbone pattern dating from the original construction. The center and west end of the first story hss a poured concrete floor (HABS Photo No. IL-1001B-6) and the east end has a wood floor covered with rubber

tile. The second story bas wood flooring covered with linoleum tile (HABS Photo No. IL-1001B-7).

4. Wall and ceiling finishes: Outer basement walls are painted rock-faced asblar limestone. The piers are exposed and painted. The ceiling is exposed concrete beams and slab.

   Outer first-floor walls are painted plaster (HABS Photo No. IL-1001B-6). Partition walls include painted gypsum board and painted plaster. Along the wall between tbe center and the west end (HABS Photo No. IL-1001B-6) original, vertical, painted, beaded, tongue-and-groove board wainscoting survives on both sides. Tbe ceiling is suspended acoustical tile in the east end and exposed, sawn, wood joists with beaded, tongue-and-groove, painted boards in the center (HABS Photo No. IL-1001B-6) and west ends.

   The second-floor outer walls are painted plaster and painted brick (HABS Photo No. IL-1001B-7). The interior walls are painted plaster; original, painted, horizontal, tongue-and-groove board; original, painted, vertical, beaded, tongue-and-groove, board around the spiral staircase; modern wood veneer panelling; and demountable partitions (HABS Photo No. IL-1001B-7). The ceiling is suspended acoustical tile (HABS Photo No. IL-1001B-7).

   Tbe hose tower has unpainted brick and limestone walls and an unfinished board ceiling.

5. Openings:

   a. Doorways and doors: Two original doorways survive in the second floor. They have plain, four-panel doors witb very plain wood casings.

   b. Windows: Window openings in the east end retaintheir original, painted, plain wood casings. Those in the center and west end retain their original brick openings. In the north wall of the women's bathroom there is a four-light, pivoting, wood sash with a plain casing. In the wall around the top of the spiral staircase are two, twelve-light, fixed, wood sash.

6. Decorative features and trim: Tbe only surviving original trim is the painted, molded, wood baaeboards associated with original walls.

7. Hardware: No original door hardware survives. Surviving original window hardware includes sash cords, pulleys, weights, and locks with porcelain knobs.

8. Mechanical equipment:

a. Heating, air conditioning, ventilation: The building is heated by steam pipes (HABS Photo No. IL-1001B-7) and radiators from a central heating plant (Building 227).

b. Lighting: Artificial illumination is by means of fluorescent electrical fixtures (HABS Photo No. IL-1001B-7) with a few incandescent fixtures. No evidence remains of original artificial lighting systems.

c. Plumbing: No original plumbing fixtures survive.

D. Site:

General setting and orientation: The building is centered between Gillespie Avenue and Flagler Street, south of Rodman Avenue, the arsenal's principal street. Building 360, a fourplex apartment, across Rodman Avenue, balances the mass of this building. Surrounding the building on virtually all sides is pavement for drives or parking. The relatively level site slopes gently to the south.

Prepared by: David Arbogast
Architectural Conservator
February 1985

PART III. SOURCES OF INFORMATION

A. Original Architectural Drawings:

All of the drawings listed below are in the Rock Island Arsenal Engineering Plans and Services Division.

"Existing Building No. 225 / Elevations & Basement Plant," 1969. (See HABS Photo No. IL-1001B-15.)

"Fire Engine & Main Guard House / Post Commissary's & Quartermaster's Office / & Storehouse," May 17, 1873, D40039A. (See HABS Photo No. I1-1001B-13.) The drawing contains notation, " Approved by the Secretary of War July 2, 1873." It depicts an "End Elevation" and a "Plan of Second Floor." The "End Elevation" shows four regularly spaced windows on the first and second floors; the original construction included only three windows on these levels.

"Fire Engine & Main Guard House / Post Commissary's & Quartermaster's Offices / & Store House," undated, D40039B. (See HABS Photo No. IL-1001B-10.) The drawing contains the notation, "Approved by the

Secretary of War July 1873." It depicts the "Front Elevation." The original construction of the north and south facades conformed to this rendering.

"Guard & Fire House / First Floor Plan / Bldg #225," April 20, 1948, Drawing No. 225-108. (See HABS Photo No. IL-1001B-14.) The drawing contains the notation that it is a tracing of an original drawing, a copy of which was "Returned to Chief of Ordinance July 12, 1873." Original construction conformed to the plan.

"Guard and Fire House / Second Floor Plan / Bldg #225," March 31, 1948, 223-109. (See HABS Photo No. IL-1001B-11.) The drawing contains the notation that it is a copy of an original drawing, a copy of which was "Returned to Chief of Ordinance July 12, 1873." Original construction conformed to the plan.

"Overhead Doors and Floor Slab, Bulding 225," May 7, 1980, Drawing No. 225-19. Plans for changing grade on north elevation to accommodate new overhead vehicle doors.

"Plan of First Floor," 1873. D40039. (See HABS Photo No. IL-1001B-12.)

"Preliminary Alterations for Fire Engine House," May 8, 1919, RIA B225-A4, DA0039F. Shows window and door alterations on west elevation and construction of hose drying tower on southeast corner.

B. Early Views:

All of the photographs listed below are in the picture collection of the Rock Island Arsenal Historical Office.

Photograph of north and east elevations, ca. 1875, captioned on front, "Guard House." (See HABS Photo No. IL-1001B-8.) View documents original construction. Date of photograph provided by Robert Bouilly, Historical Supervisor, Rock Island Arsenal Historical Office.

Photograph of north and west elevations, published in 1898 (Tillinghast). View documents unaltered state of north facade and remodeling of window into door on west elevation.

Photograph of central pavilion on north facade, captioned "257-31636 December 17, 1918 / Fire Headquarters." View documents alterations to accommodate two vehicle doors.

Photograph of east elevation after addition of hose drying tower, dated September 26, 1919. (See HABS Photo No. IL-1001B-9.)

Photograph of north and west elevations, captioned on front, "425-34417 / Sept. 28, 1920 / Guard and Fire House, Bldg. No. 225, looking southeast."

Photograph of west elevation, captioned on front, "11-070-398-1448 / 31 May 1962 / Stone That Was Removed from West Side of Building 225 on 29 May 1962." View documents widening of vehicle doors on west elevation.

C. Bibliography:

1. Primary and unpublished sources:
Hess, Jeffrey A., and Mack, Robert C. "Historic Properties Report Rock Island Arsenal, Rock Island, Illinois". Prepared by MacDonald and Mack Partnership, and Building Technology Incorporated for the Historic American Buildings Survey/Historic American Engineering Record, National Park Service, U.S. Department of the Interior, 1985. The report, with accompanying inventory cards, is filed as field records in the Prints and Photographs Division, Library of Congress, under HAER No. IL-20.

"Industrial Facilities Inventory, Rock Island Arsenal." Prepared by U.S. Army Corps of Engineers, Rock Island District, 1946. Rock Island Arsenal Engineering Plans and Services Division. Lists building as "Building 225."

Real Property Cards, Rock Island Arsenal Engineering Plans and Services Division. Briefly describes building's structural characteristics and provides sketchy history of maintenance operations.

2. Secondary and published sources:

Bouilly, Robert. "Arsenal Island." Joined by a River: Quad Cities, ed. Frederick I. Anderson. N. pl.: Lee Enterprises, Incorporated, 1982. Excellent historical analysis of the arsenal's development to about 1910, written by a historian in the Rock Island Arsenal Historical Office.

Flagler, D[aniel] W[ebster]. A History of the Rock Island Arsenal from Its Establishment in 1863 to December 1876. Washington, D.C.: Government Printing Office, 1877. Provides most detailed description of building's planning and construction.

Nothstein, Ira O. and Stephens, Clifford W. A History of Rock Island Arsenal from Earliest Times to 1954. Rock Island: U.S.

Army, Rock Island Arsenal, 1965. 3 vols. Rock Island Arsenal Historical Office. The best account of the arsenal's general operations.

Tillinghast, B. F. Rock Island Arsenal: In Peace and in War. Chicago: The Shepard Company, 1898. Reproduces photograph of north and west elevations.

D. Likely Sources Not Yet Investigated:

Record Group 156 at the National Archives contains correspondence on the construction and operation of Rock Island Arsenal from 1871 to 1903. This material is also available on 216 reels of microfilm at the Browning Museum, Rock Island Arsenal.

PART IV. PROJECT INFORMATION

This project was part of a program initiated through a memorandum of agreement between the National Park Service and the U.S. Department of the Army. Stanley J. Fried, Chief, Real Estate Branch of Heaquarters DARCOM, and Dr. Robert J. Kapsch, Chief of the Historic American Buildings Survey/Historic American Engineering Record, were program directors. Sally Kress Tompkins of HABS/HAER was program manager, and Robie S. Lange of HABS/HAER was project manager. Building Technology Incorporated, Silver Spring, Maryland, under the direction of William A. Brenner, acted as primary contractor, and MacDonald and Mack Partnership, Minneapolis, was a major subcontractor. The project included a survey of historic properties at Rock Island Arsenal, as well as preparation of an historic properties report and HABS/HAER documentation for 38 buildings. The survey, report, and documentation were completed by Jeffrey A. Hess, historian, Minneapolis; Barbara E. Hightower, historian, Minneapolis; David Arbogast, architectural historian, Iowa City, Iowa; and Robert C. Mack, architect, Minneapolis. The photographs were taken by Robert A. Ryan, J Ceronie, and Bruce A. Harms of Dennett, Muessig, Ryan, and Associates, Ltd., Iowa City, Iowa. Drawings were produced by John Palmer Low, Minneapolis.